IN THE CLAIMS

What is claimed is:

1	1.	A computer software product including one or more recordable media having
2		executable instructions stored thereon which, when executed by a processing
3		device, causes the processing device to:
4		initialize a symbolic simulation relation for an assertion graph on a first
5		symbolic lattice domain.
1	2.	The computer software product recited in Claim 1 wherein initializing the
2		symbolic simulation relation comprises causing the processing device to:
3		join a Boolean predicate for an outgoing edge from an initial vertex in the
4		assertion graph with a symbolic antecedent labeling of an edge in the
5		assertion graph.
1	3.	The computer software product recited in Claim 2 wherein the symbolic
2		antecedent labeling comprises a symbolic indexing function to encode a
3	,	plurality of antecedent labels for a plurality of assertion graph instances,
4		having at least one assertion graph instance on a second lattice domain
5		different from the first symbolic lattice domain.
1	4.	The computer software product recited in Claim 1 wherein the assertion
2		graph on the first symbolic lattice domain is configurable to express a
3		justification property to verify by computing the symbolic simulation relation.
1	5.	The computer software product recited in Claim 4 which, when executed by a
2		processing device, further causes the processing device to:
3		compute the symbolic simulation relation for the assertion graph on the
4		first symbolic lattice domain; and

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check the symbolic simulation relation to verify a plurality of properties

6		expressed by a plurality of assertion graph instances, having at least one
7		assertion graph instance on a second lattice domain different from the first
8		symbolic lattice domain.
1	6.	The computer software product recited in Claim 1 which, when executed by a
2		processing device, further causes the processing device to:
3		compute the symbolic simulation relation for the assertion graph on the
4		first symbolic lattice domain; and
5		compare the symbolic simulation relation to a symbolic consequence
6		labeling for the edge for the assertion graph on the first symbolic lattice
7		domain.
1	· 7.	The computer software product recited in Claim 6 wherein computing the
2		symbolic simulation relation comprises causing the processing device to:
3		join the symbolic simulation relation for the assertion graph on the first
4		symbolic lattice domain, to any states that are contained by a symbolic
5		antecedent for a first plurality of edges of the assertion graph on the first
6		symbolic lattice domain and also contained by a symbolic post-image for a
7		second plurality of edges incoming to the first plurality of edges.
1	8.	The computer software product recited in Claim 1 which, when executed by a
2		processing device, further causes the processing device to:
3		compute the symbolic simulation relation for the assertion graph on the
4		first symbolic lattice domain to verify the assertion graph according to a
5		normal satisfiability criteria.
1	9	A method comprising:

initializing a symbolic simulation relation for an assertion graph on a first symbolic lattice domain.

1	10. The method recited in Claim 9 wherein initializing the symbolic simulation
2	relation comprises:
3	joining a Boolean predicate for an outgoing edge from an initial vertex in
4	the assertion graph with a symbolic antecedent labeling of an edge in the
5	assertion graph.
1	11. The method recited in Claim 10 wherein the symbolic antecedent labeling
2	comprises a symbolic indexing function to encode a plurality of antecedent
3	labels for a plurality of assertion graph instances, having at least one
4	assertion graph instance on a second lattice domain different from the first
5	symbolic lattice domain.
1	12. The method recited in Claim 9 further comprising:
2	computing the symbolic simulation relation for the assertion graph on the
3	first symbolic lattice domain; and
4	comparing the symbolic simulation relation to a symbolic consequence
5	labeling for the edge for the assertion graph on the first symbolic lattice
6	domain.
1	13. The method recited in Claim 12 wherein computing the symbolic simulation
2	relation comprises:
3	joining the symbolic simulation relation for the assertion graph on the firs
4	symbolic lattice domain, to any states that are contained by a symbolic
5	antecedent for a first plurality of edges of the assertion graph on the first
6	symbolic lattice domain and also contained by a symbolic post-image for a
7	second plurality of edges incoming to the first plurality of edges.
1	14. The method recited in Claim 9 wherein the assertion graph on the first
2	symbolic lattice domain is configurable to express a justification property to
3	verify through computing the symbolic simulation relation.

1	15.The method∕ recited in Claim 14 further comprising:
2	computing the symbolic simulation relation for the assertion graph on the
3	first symbolic lattice domain; and
4	checking the symbolic simulation relation to verify a plurality of properties
5	expressed by a plurality of corresponding assertion graph instances, having
6	at least one assertion graph instance on a second lattice domain different
7	from the first symbolic lattice domain.
1	16. A method comprising:
2	specifying a justification property with an assertion graph.
1	17. The method recited in Claim 16 wherein the assertion graph is on a first
2	symbolic lattice domain; and the justification property is expressed by one of
3	a plurality of instances of the assertion graph, at least one assertion graph
4	instance on a second lattice domain different from the first symbolic lattice
5	domain.
1	18. The method recited in Claim 17 further comprising:
2	computing a symbolic simulation relation for the assertion graph on the
3	first symbolic lattice domain; and
4	checking the symbolic simulation relation with a symbolic consequence
5	labeling for the assertion graph on the first symbolic lattice domain according
6	to a normal satisfiability criteria.
1	19.A method comprising:
2	merging a plurality of properties in an assertion graph on a first symbolic
3	lattice domain by using a symbolic labeling.
1	20. The method recited in Claim 19 wherein the symbolic labeling comprises a
2	symbolic indexing function to encode a plurality of labels for a plurality of

3	assertion graph instances, having at least one assertion graph instance on a
4	second lattice domain different from the first symbolic lattice domain.
1	21.A formal verification method comprising:
2	defining an assertion graph including an antecedent label and a
3	consequence label;
4	simulating a finite state system having an initial state condition or an input
5	to generate a subsequent state condition or an output;
6	comparing the initial state condition or the input to any antecedent along
7	an infinite transition path through the assertion graph to identify any
8	antecedent violation; and
9	comparing the subsequent state condition or the output to the
10	consequence if no antecedent violation was identified.
1	22. A verification system comprising:
2	means for initializing a symbolic simulation relation for an assertion graph
3	on a first symbolic lattice domain.
1	23. The verification system of Claim 22 wherein the means for initializing the
2	symbolic simulation relation comprises:
3	means for joining a Boolean predicate for an outgoing edge from an initial
4	vertex in the assertion graph with a symbolic antecedent labeling of an edge
5	in the assertion graph.
1	24. The verification system of Claim 23 wherein the symbolic antecedent labeling
2	comprises a symbolic indexing function to encode a plurality of antecedent
3	labels for a plurality of assertion graph instances, having at least one
4	assertion graph instance on a second lattice domain different from the first
5	symbolic lattice domain.

1	25. The verification system of Claim 22 further comprising:
2	means for computing the symbolic simulation relation for the assertion
3	graph on the first symbolic lattice domain; and
4	means for comparing the symbolic simulation relation to a symbolic
5	consequence labeling for the edge for the assertion graph on the first
6	symbolic lattice domain.
1	26. The method recited in Claim 25 wherein the means for computing the
2	symbolic simulation relation comprises:
3	means for joining into what is already contained by the symbolic
4	simulation relation for the assertion graph on the first symbolic lattice domain
5	any states that are contained by a symbolic antecedent for a first plurality of
6	edges of the assertion graph on the first symbolic lattice domain and also
7	contained by a symbolic post-image for a second plurality of edges incoming
8	to the first plurality of edges.
1	27. The verification system of Claim 9 wherein the assertion graph on the first
2	symbolic lattice domain is configurable to express a justification property to
3	verify through computing the symbolic simulation relation.
1	28. The verification system of Claim 27 further comprising:
2	means for computing the symbolic simulation relation for the assertion
3	graph on the first symbolic lattice domain; and
4	means for checking the symbolic simulation relation to verify a plurality of
5	properties expressed by a plurality of corresponding assertion graph
6	instances, having at least one assertion graph instance on a second lattice
7	domain different from the first symbolic lattice domain.
1	29. A verification system comprising:
2	means for specifying a justification property with an assertion graph.

30. The verification system of Claim 29 wherein the assertion graph is on a first symbolic lattice domain; and the justification property is expressed by one of a plurality of instances of the assertion graph, at least one assertion graph instance on a second lattice domain different from the first symbolic lattice domain.